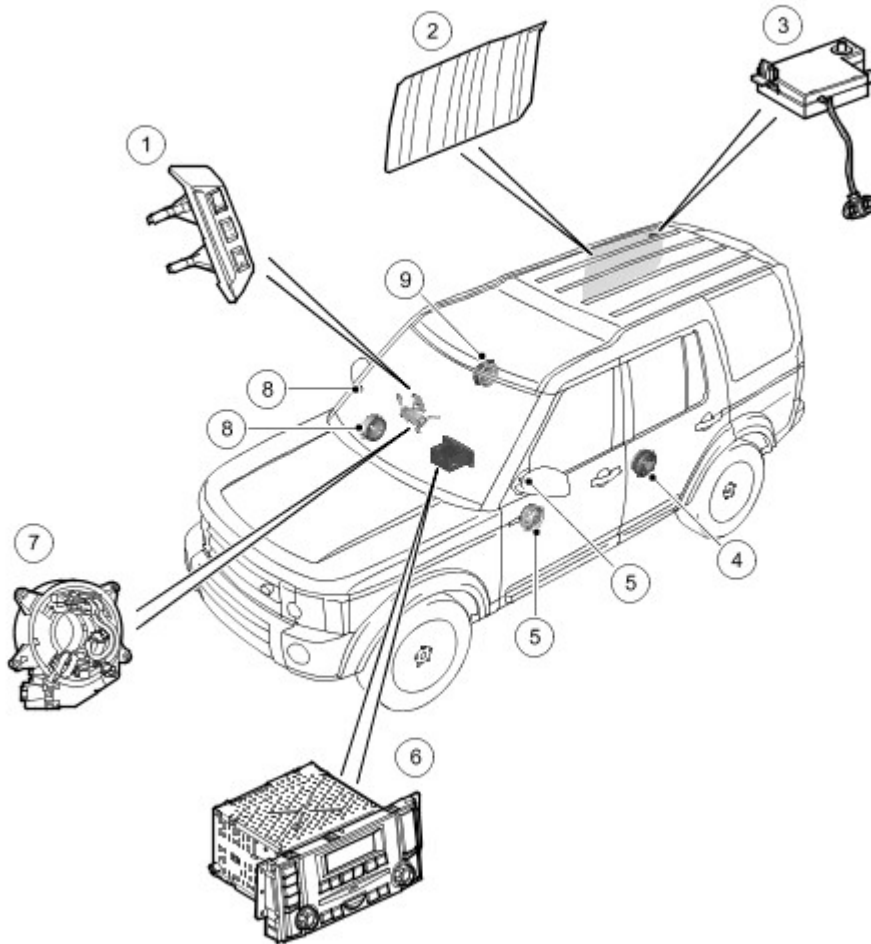


Audio System

Low Line Audio Component Location



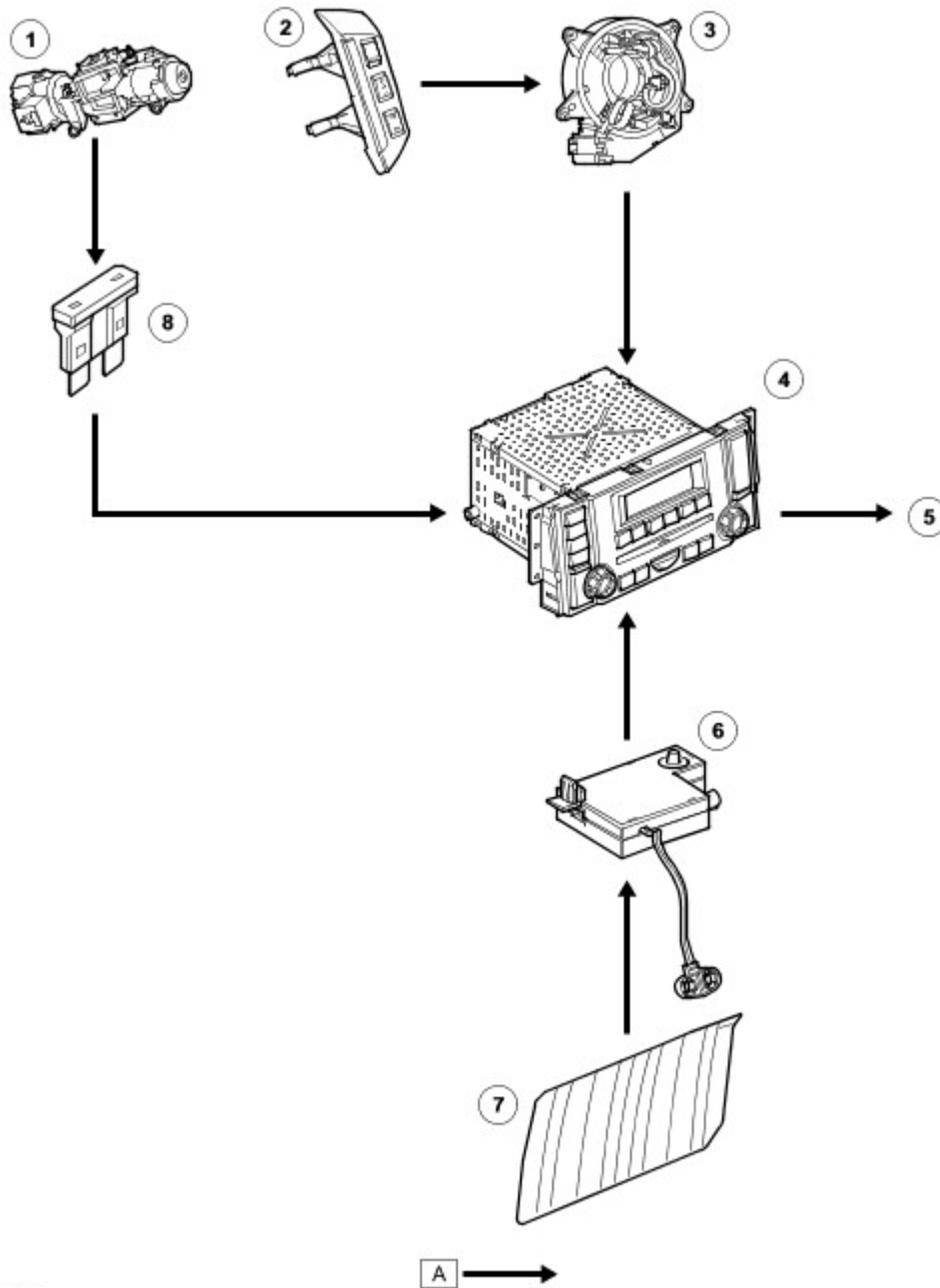
E47719

| Item | Part Number | Description |
|------|-------------|-------------------------------------|
| 1 | - | Audio control switches |
| 2 | - | Screen antennas |
| 3 | - | Antenna amplifier |
| 4 | - | Rear LH (left-hand) door speakers |
| 5 | - | Front LH (left-hand) door speakers |
| 6 | - | Head unit |
| 7 | - | Clock spring |
| 8 | - | Front RH (right-hand) door speakers |
| 9 | - | Rear RH (right-hand) door speakers |

Head Unit Audio Control Diagram

NOTE :

A= Hardwired

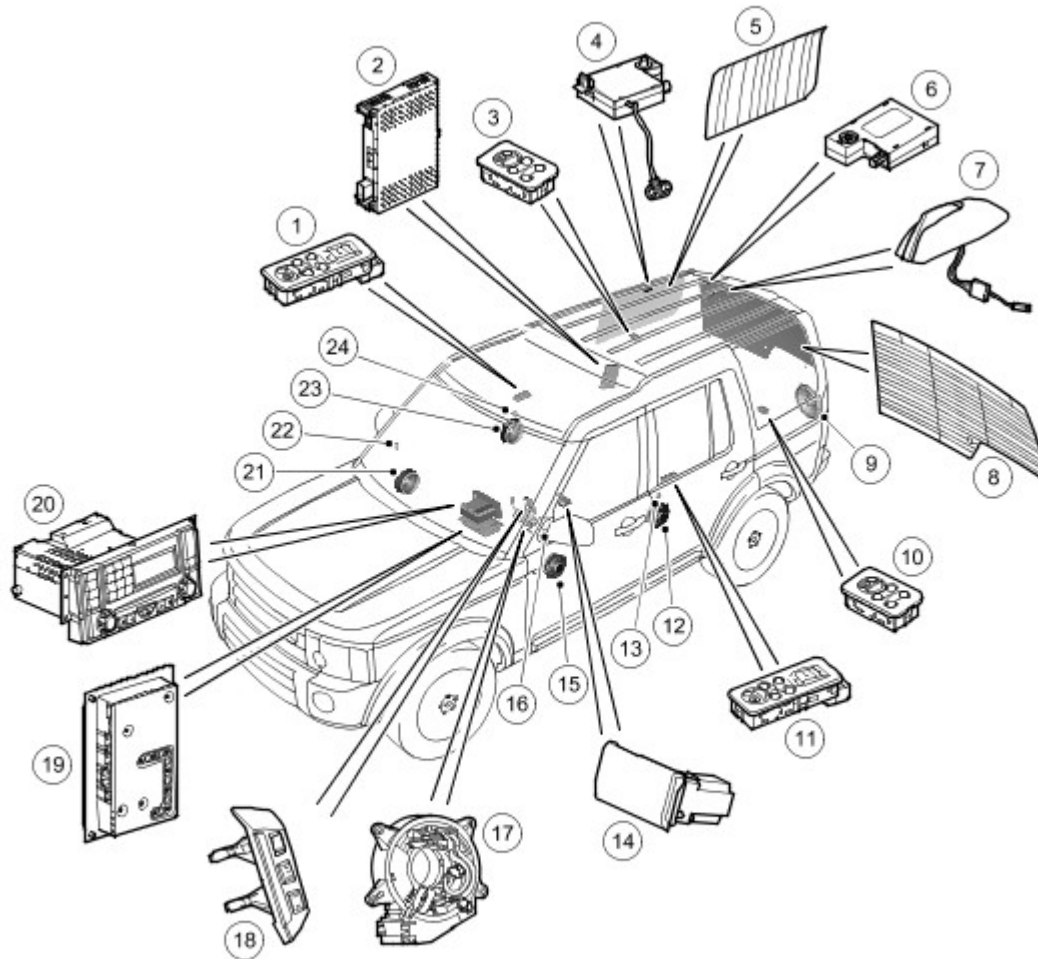


E47721

| Item | Part Number | Description |
|------|-------------|--|
| 1 | - | Ignition switch |
| 2 | - | Audio remote controls |
| 3 | - | Clock spring |
| 4 | - | Head unit |
| 5 | - | Speakers |
| 6 | - | Antenna amplifier |
| 7 | - | AM (amplitude modulation) /FM (frequency modulation) antenna |
| | | |

| | | |
|---|---|------|
| 8 | - | Fuse |
|---|---|------|

Integrated Head Unit (IHU) Audio System Component Location



E47720

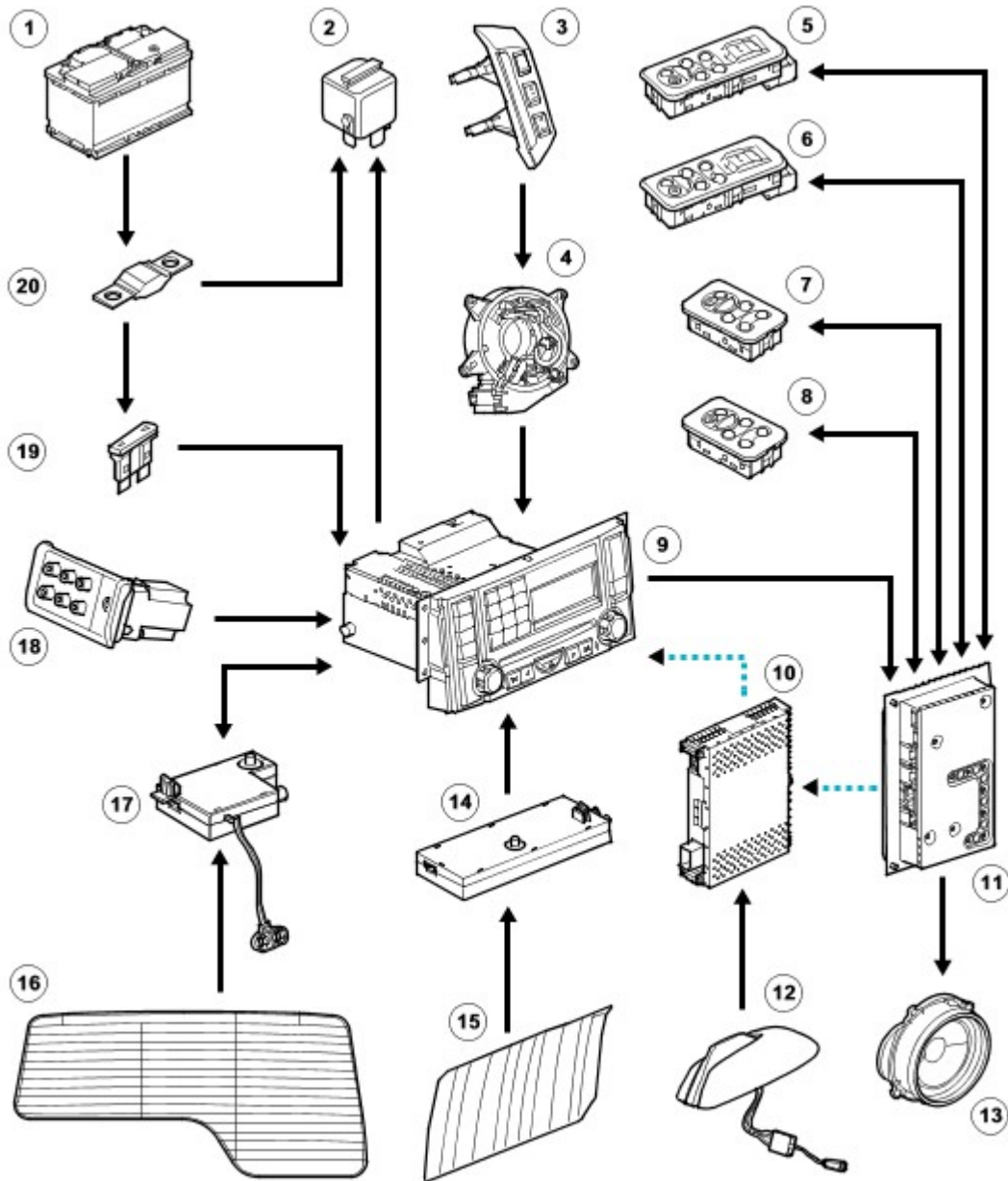
| Item | Part Number | Description |
|------|-------------|--|
| 1 | - | Row two remote audio controls |
| 2 | - | TMC tuner |
| 3 | - | Row three audio remote controls |
| 4 | - | Antenna amplifier |
| 5 | - | Side screen AM (amplitude modulation) /FM (frequency modulation) antenna |
| 6 | - | Diversity antenna amplifier |
| 7 | - | SDARS/Telephone antenna roof mounted pod |
| 8 | - | Rear screen antennas |
| 9 | - | Subwoofer |
| 10 | - | Row three audio remote controls |
| 11 | - | Row two audio remote controls |
| 12 | - | Mid range speaker |
| 13 | - | Tweeter |

| | | |
|----|---|--------------------------------|
| 14 | - | Audio Video Input/Output panel |
| 15 | - | Mid range speaker |
| 16 | - | Tweeter |
| 17 | - | Clock spring |
| 18 | - | Audio remote controls |
| 19 | - | Audio amplifier |
| 20 | - | Integrated Head Unit (IHU) |
| 21 | - | Mid range speaker |
| 22 | - | Tweeter |
| 23 | - | Mid range speaker |
| 24 | - | Tweeter |

Integrated Head Unit (IHU) Audio Control Diagram

NOTE :

A= Hardwired P= MOST



E47722



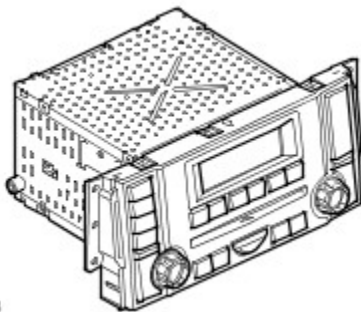
| Item | Part Number | Description |
|------|-------------|---------------------------------|
| 1 | - | Battery |
| 2 | - | Infotainment main relay |
| 3 | - | Audio remote controls |
| 4 | - | Clock spring |
| 5 | - | Row two audio remote controls |
| 6 | - | Row two audio remote controls |
| 7 | - | Row three audio remote controls |
| 8 | - | Row three audio remote controls |
| 9 | - | Integrated Head Unit (IHU) |
| 10 | - | SDARS tuner |

| | | |
|----|---|--|
| 11 | - | Audio amplifier |
| 12 | - | SDARS/telephone antenna roof mounted pod |
| 13 | - | Speakers |
| 14 | - | Side screen antenna diversity amplifier |
| 15 | - | Side screen AM (amplitude modulation) /FM (frequency modulation) antenna |
| 16 | - | Rear screen antennas |
| 17 | - | Rear screen antenna amplifier |
| 18 | - | Audio/video input/output panel |
| 19 | - | Fuse 53p |
| 20 | | Fuseable link 18E |

HEAD UNITS

The audio systems has two levels of head unit. A low line and high line unit. The low line unit system is based around a head unit which communicates on the medium speed CAN (controller area network) bus while the High line system is based around an Integrated Head Unit (IHU) which communicates on the Media Orientated System Transport (MOST) ring and the medium speed CAN (controller area network) bus.

LOW LINE AUDIO HEAD UNIT



The low line Head Unit (HU) contains the following functionality:

- Radio tuner
- Single disc CD (compact disc) player
- Amplifier

The HU communicates with other vehicle systems on the CAN (controller area network) bus.

Connector C1354 Pinout Table For Low Line Head Unit

| Pin No | Description | Input/Output |
|--------|------------------------------------|--------------|
| 1 | Power ground | - |
| 2 | | |
| 3 | Speaker rear LH (left-hand) + | Output |
| 4 | Speaker rear LH (left-hand) - | - |
| 5 | Speaker rear RH (right-hand) + | Output |
| 6 | Speaker rear RH (right-hand) - | - |
| 7 | Steering wheel controls signal | Input |
| 8 | Not used | - |
| 9 | CAN (controller area network) in + | Input |

| | | |
|----|---|--------|
| 10 | CAN (controller area network) out - | - |
| 11 | Battery voltage | Input |
| 12 | Antenna power + | Output |
| 13 | Speaker front LH (left-hand) - | - |
| 14 | Speaker front LH (left-hand) + | Output |
| 15 | Speaker front RH (right-hand) - | - |
| 16 | Speaker front RH (right-hand) + | Output |
| 17 | Not used | - |
| 18 | Steering wheel controls reference voltage + | Output |
| 19 | CAN (controller area network) out + | Output |
| 20 | CAN (controller area network) out - | - |

The HU incorporates a power management function. Should the vehicle battery level drop below a predetermined level the unit will limit its functionality. The HU receives CAN (controller area network) signals which help it determine the wake up/shut down process. The following describes the wake up/shut down triggers initiated by the ignition key switching cycle.

- If CAN (controller area network) Bus activity is detected and the battery voltage is above 12.3 volts, the HU will display the clock on the LCD (liquid crystal display) .
- With the ignition key inserted and the ignition switch turned to ACC/AUX, the HU will operate normally in power save mode if the HU was powered down with the 1 hour power save time out.
- If the key is moved from ACC/AUX to IGN/RUN the HU still has normal functionality.
- If the key is moved from IGN/RUN to crank HU audio is muted during engine crank.
- Once engine cranking is complete and the ignition key is returned to IGN/RUN the HU will operate in normal power mode.
- Turning the key from IGN/RUN to ACC/AUX will cause the HU to go into power save mode, limiting the output volume.
- Turning the key from ACC/AUX to the key in position will cause the HU to operate in power save mode for ten minutes. After this time the HU will go into stand by mode. If the ignition key is not removed and the CAN (controller area network) network goes into sleep mode, the HU will shut down completely. The HU will only power up again once any the following conditions have been met; The door lock status changes from lock to unlock, the key position changes from key in to ACC/AUX, pressing the power button on the HU, inserting or ejecting a CD (compact disc) .
- Removing the ignition key will cause the HU to enter stand-by mode. The only exception to this is if a phone call is in progress, where the HU will stay powered until the phone call is over and then return to stand-by mode.

All of the previous power strategies rely upon receiving the ignition key switch status via CAN (controller area network) .

Transit Mode

Transit mode is used to reduce the vehicle battery current drain whilst the vehicle is being stored or transported. Transit mode is entered/exited via a CAN (controller area network) signal from T4. In transit mode the following circuits will be disabled:

- Amplifiers
- Aux and phone call
- Clock
- Antenna power
- LED (light emitting diode) illumination

In transit mode the CAN (controller area network) port and the ON/OFF switch are the only circuits that are left active.

The CAN (controller area network) port is left open to allow the EXIT from transit mode signal to be received. The ON/OFF switch is left active to allow feedback to the driver via the HU LCD (liquid crystal display) , that the unit is in Transit mode should the driver attempt to power up the HU. This will only occur when the vehicle engine is running and the battery is above 12.3 Volts.

Radio Function

The radio tuner is located in the head unit. The radio is capable of receiving AM and FM waveband and can store 18 FM pre-sets and 12 AM (amplitude modulation) pre-sets. The AM (amplitude modulation) presets are stored as follows:

European Preset Storage

- 6 MW
- 6 MWa
- 6 LW
- 6LWa

NAS Preset Storage

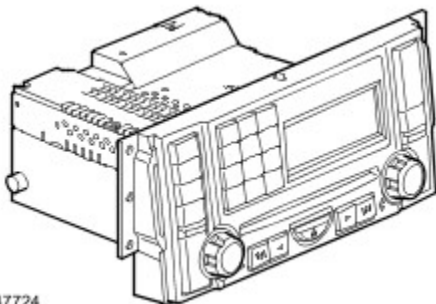
- 6 MW1
- 6 MW2
- 6 MWa

CD (compact disc) Function

The HU includes single play CD (compact disc) player. The CD (compact disc) player has all the usual functions of a CD (compact disc) player:

- CD (compact disc) play
- Previous/next track
- Shuffle tracks
- Load/eject CD (compact disc)
- Scan
- Repeat

INTEGRATED HEAD UNIT



The high line head unit contains the following functionality:

- Radio tuner.
- CD (compact disc) player (Six disc in dash changer).
- Integrated telephone control.
- Auxiliary input (for any device featuring a 3.5mm jack plug output).

The IHU (Integrated Head Unit) unit also integrates with the navigation system, this requires the addition of a navigation computer, touch screen display and GPS (global positioning system) antenna.

The IHU is woken up by CAN (controller area network) bus activity and is not woken up from the ignition aux position.

The IHU is the Bus Master for the MOST system and contains the timing master for the MOST system.

Connector C1354 Pinout Table For High Line Audio

| Pin No | Description | Input/Output |
|--------|-------------|--------------|
| | | |

| | | |
|----|---|--------|
| 1 | Ground | - |
| 2 | Not used | - |
| 3 | Not used | - |
| 4 | Not used | - |
| 5 | Not used | - |
| 6 | Not used | - |
| 7 | Steering wheel switch ground | - |
| 8 | Infotainment relay switch | Output |
| 9 | CAN (controller area network) + | Input |
| 10 | CAN (controller area network) - | Output |
| 11 | Battery voltage | Input |
| 12 | Antenna power | Output |
| 13 | Not used | - |
| 14 | Not used | - |
| 15 | Not used | - |
| 16 | Not used | - |
| 17 | Not used | - |
| 18 | Steering wheel switch reference voltage | Output |
| | CAN (controller area network) + | Input |
| | CAN (controller area network) - | Output |

Connector C2115 Pinout Table

| Pin No | Description | Input/Output |
|--------|---------------------------|--------------|
| 1 | Not used | - |
| 2 | Not used | - |
| 3 | Phone + | Output |
| 4 | Not used | - |
| 5 | Phone - | - |
| 6 | Aux Screen | - |
| 7 | Right aux Jack plug input | Input |
| 8 | Left aux Jack plug input | Input |
| 9 | Not used | - |
| 10 | Not used | - |
| 11 | Not used | - |
| 12 | Audio Ground | - |

Tuner

The IHU incorporates a AM (amplitude modulation) /FM (frequency modulation) tuner which allows for 18 FM (frequency modulation) pre-sets and 12 AM (amplitude modulation) (6 MW and 6 LW) pre-set stations to be stored in the IHU memory. The radio tuner also incorporates the following radio functions:

- Auto tune
- Traffic announcements (TA)
- RDS (radio data system) EON function
- Seek station
- Tune up/down

CD (compact disc) Player

The CD (compact disc) player is a 6 disc in dash mounted device. The CD (compact disc) multi changer is capable of playing commercial CD (compact disc) s, CD (compact disc) Rs, CD (compact disc) RWs and MP3 discs.

Random Play

The Random feature only works on the CD (compact disc) , which has been selected. The Random feature plays all the tracks on the selected CD (compact disc) in a random order. All the tracks on that disc will be played before a new random sequence is played. If a new CD (compact disc) is selected while in random mode, the random mode will be cancelled and play will commence from track 1.

Repeat

The Repeat feature allows the current track to be repeated in an endless loop, when selected by the user.

MP3

The CD (compact disc) player has the capability to play MP3 files. The MP3 discs follow a format of folders and files within the folder. It is also possible to place all the files in the root directory on the CD (compact disc) .

The random and repeat features follow the normal CD (compact disc) random and repeat feature functions.

Scan

Scan allows the user to play the first 10 seconds of each track on the CD (compact disc) s in the unit.

Automatic Volume Control-AVC

The AVC feature is designed to adjust output volume to compensate for the rising level noise of the vehicle as the vehicle travels faster.

There are 10 settings for AVC, where 0 = off, 1 is the lowest setting (minimum volume change with speed and 9 the maximum).

The vehicle speed signal is used to enable the IHU to calculate the volume adjustment required. The vehicle speed signal is received over the CAN (controller area network) from the ABS (anti-lock brake system) control module. The signal is an average of the four wheel speed sensor signals.

Control of the AVC is carried out by the audio amplifier.

Should an invalid speed signal be received the AVC will not alter the output volume.

CLOCK

The IHU contains the master clock functionality. The IHU contains and displays the clock in one unit. Other vehicle modules that require clock functionality use the time supplied from the IHU.

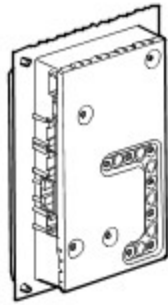
The clock is available to any control module that is connected to an interconnecting bus i.e. either of the CAN (controller area network) busses or the MOST ring.

The clock display configurable to show in AM/PM or 24 hour format. Midnight is shown as 12:00AM or 0:00 respectively. The default condition, if not specified, after power on or delivery, should default to 1:00PM or 13:00. Depending upon the market set the clock will default to either 12 or 24 hour format.

The time is adjusted from the IHU. This will ensure that all vehicle clocks will be synchronized at all times. Under conditions when any bus could be asleep or shut down, the HMI does not allow clock adjustments.

AMPLIFIERS

Harman Kardon High Line/Logic 7 Amplifier



E47726

The audio system has the option of one of two audio amplifiers:

- Harman Kardon
- Harman Kardon Logic 7

The amplifier is located under the RH (right-hand) front seat and is connected to the audio system via the MOST bus.

Speaker Connector C0491 for Harman Kardon Amplifier

| Pin No | Description | Input/Output |
|--------|--------------------------------------|--------------|
| 1 | LH (left-hand) rear door speaker - | - |
| 2 | RH (right-hand) rear door speaker - | - |
| 3 | Not used | - |
| 4 | Not used | - |
| 5 | LH (left-hand) front door speaker - | - |
| 6 | RH (right-hand) front door speaker - | - |
| 7 | Subwoofer left - | - |
| 8 | Subwoofer right - | - |
| 9 | LH (left-hand) rear door speaker + | Output |
| 10 | RH (right-hand) rear door speaker + | Output |
| 11 | Not used | - |
| 12 | Not used | - |
| 13 | LH (left-hand) front door speaker + | Output |
| 14 | RH (right-hand) front door speaker + | Output |
| 15 | Subwoofer left + | Output |
| 16 | Subwoofer right + | Output |

Speaker Connector C0491 for Harman Kardon Logic 7 Amplifier

| Pin No | Description | Input/Output |
|--------|--------------------------------------|--------------|
| 1 | LH (left-hand) rear door speaker - | - |
| 2 | RH (right-hand) rear door speaker - | - |
| 3 | LH (left-hand) front bass speaker - | - |
| 4 | RH (right-hand) front bass speaker - | - |
| 5 | Rear surround left - | - |
| 6 | Rear surround right - | - |
| 7 | Subwoofer left - | - |
| 8 | Subwoofer right - | - |
| | | |

| | | |
|----|--------------------------------------|--------|
| 9 | LH (left-hand) rear door speaker + | Output |
| 10 | RH (right-hand) rear door speaker + | Output |
| 11 | LH (left-hand) front bass speaker + | Output |
| 12 | RH (right-hand) front bass speaker + | Output |
| 13 | Rear surround left + | Output |
| 14 | Rear surround right + | Output |
| 15 | Subwoofer left + | Output |
| 16 | Subwoofer right + | Output |

Speaker Connector C0492 for Harman Kardon Amplifier

| Pin No | Description | Input/Output |
|--------|----------------------------------|--------------|
| 1 | Not used | |
| 2 | Not used | |
| 3 | Not used | |
| 4 | Not used | |
| 5 | Headphone module 1 left channel | Output |
| 6 | Headphone module 1 right channel | Output |
| 7 | Headphone module 2 right channel | Output |
| 8 | Headphone module 2 left channel | Output |
| 9 | Not used | - |
| 10 | Not used | - |
| 11 | Not used | - |
| 12 | Not used | - |
| 13 | Not used | - |
| 14 | Not used | - |
| 15 | Headphone module 1 left ground | - |
| 16 | Headphone module 1 right ground | - |
| 17 | Headphone module 2 left ground | - |
| 18 | Headphone module 2 right ground | - |
| 19 | Not used | - |
| 20 | Not used | - |

Speaker Connector C0493 for Harman Kardon Amplifier

| Pin No | Description | Input/Output |
|--------|-----------------------------------|--------------|
| 1 | Headphone module 3 left channel | Output |
| 2 | Headphone module 3 right channel | Output |
| 3 | Headphone module 4 left channel | Output |
| 4 | Headphone module 4 right channel | Output |
| 5 | Headphone module 1 control signal | Output |
| 6 | Headphone module 2 control signal | Output |
| 7 | Headphone module 3 control signal | Output |
| 8 | Headphone module 4 control signal | Output |
| 9 | Not used | - |
| 10 | Not used | - |

| | | |
|----|-----------------------------------|---|
| 11 | Headphone module 3 left ground | - |
| 12 | Headphone module 3 right ground | - |
| 13 | Headphone module 4 left ground | - |
| 14 | Headphone module 4 right ground | - |
| 15 | Headphone module 1 control ground | - |
| 16 | Headphone module 2 control ground | - |
| 17 | Headphone module 3 control ground | - |
| 18 | Headphone module 4 control ground | - |
| 19 | Not used | - |
| 20 | Not used | - |

Speaker Connector C0492 for Harman Kardon Logic 7 Amplifier

| Pin No | Description | Input/Output |
|--------|--|--------------|
| 1 | LH (left-hand) front mid/high range speaker - | - |
| 2 | RH (right-hand) front mid/high range speaker - | - |
| 3 | Center fill speaker - | - |
| 4 | Not used | - |
| 5 | Headphone module 1 left channel | Output |
| 6 | Headphone module 1 right channel | Output |
| 7 | Headphone module 2 left channel | Output |
| 8 | Headphone module 2 right channel | Output |
| 9 | Not used | - |
| 10 | Not used | - |
| 11 | LH (left-hand) front mid/high range speaker + | Output |
| 12 | RH (right-hand) front mid/high range speaker + | Output |
| 13 | Center fill speaker + | Output |
| 14 | Not used | - |
| 15 | Headphone module 1 left channel ground | - |
| 16 | Headphone module 1 right ground | - |
| 17 | Headphone module 2 left ground | - |
| 18 | Headphone module 2 right ground | - |
| 19 | Not used | - |
| 20 | Not used | - |

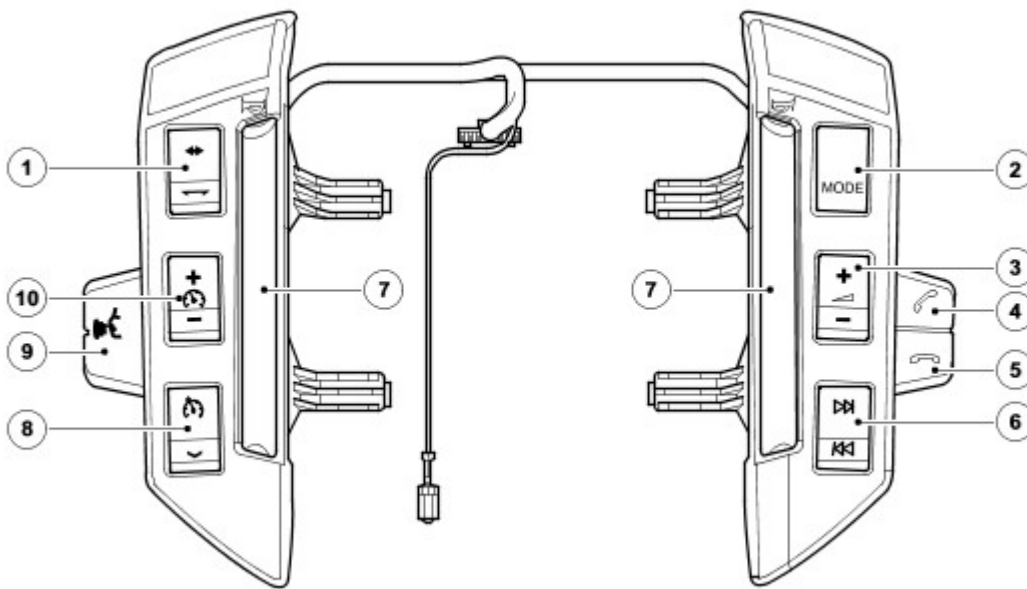
Speaker Connector C0493 for Harman Kardon Logic 7 Amplifier

| Pin No | Description | Input/Output |
|--------|-----------------------------------|--------------|
| 1 | Headphone module 3 left channel | Output |
| 2 | Headphone module 3 right channel | Output |
| 3 | Headphone module 4 left channel | Output |
| 4 | Headphone module 4 right channel | Output |
| 5 | Headphone module 1 control signal | Output |
| 6 | Headphone module 2 control signal | Output |
| 7 | Headphone module 3 control signal | Output |
| 8 | Headphone module 4 control signal | Output |

| | | |
|----|---|---|
| 9 | Not used | - |
| 10 | Not used | - |
| 11 | Headphone module 3 left channel ground | - |
| 12 | Headphone module 3 right channel ground | - |
| 13 | Headphone module 4 left channel ground | - |
| 14 | Headphone module 4 right channel | - |
| 15 | Headphone module 1 control ground | - |
| 16 | Headphone module 2 control ground | - |
| 17 | Headphone module 3 control ground | - |
| 18 | Headphone module 4 control ground | - |
| 19 | Not used | - |
| 20 | Not used | - |

STEERING WHEEL CONTROLS

Steering Wheel Audio Controls



E58417

| Item | Part Number | Description |
|------|-------------|--|
| 1 | | Adaptive speed control gap adjustment switches |
| 2 | | Audio mode change switch |
| 3 | | Audio volume control |
| 4 | | Send key |
| 5 | | End key |
| 6 | | Audio system up/down |
| 7 | | Horn |
| 8 | | Speed control ON/OFF/set speed |
| 9 | | Push to talk voice recognition switch |
| 10 | | Speed control set speed adjust |

The IHU can be remotely controlled via steering wheel mounted controls. The steering wheel controls are mounted to the right hand side of the steering wheel.

The switches are a resistive ladder type. The IHU supplies a reference voltage to the switches, which then return an altered voltage to the IHU depending on which switch is pressed.

The controls allow the user to adjust the volume, change CD (compact disc) tracks/radio pre-sets, answer and end a phone call (where a phone is fitted) and use the voice recognition system.

SATELLITE DIGITAL AUDIO RADIO SERVICE (SDARS NAS only)

The SDARS systems operate in the S-Band frequency range (2.3 GHz) and, as a result of the use of satellite transmission have the ability to provide CD (compact disc) quality audio broadcasts over very large areas (typically continents). SDARS service providers transmit a signal from their up-link facility (which is the original point of transmission of data, voice or other information through an antenna system) to a satellite where the signal is then down linked to both the terrestrial repeater network and the individual SDARS car radios. The radio switches between the satellite signal and the repeater signal depending on the strength of the signal at any given time.

Land Rover will be using the Sirius Satellite Radio service provider in the USA.

The Sirius SDARS systems comprise:

- Satellites
- Ground repeaters
- Up-link ground stations
- Radio receiver systems

The Sirius SDARS system uses three satellites on an inclined elliptical orbit. This ensures that each satellite spends approximately 16 hours a day over the continent of the USA, with at least one satellite over the country at any one time.

The satellites beam their signals down to the ground where the signal is picked up by receivers or is transmitted to repeater stations to cover built up areas where the signal is obscured.

TRAFFIC MESSAGE CHANNEL (TMC)

The TMC system is a European only system whereby traffic information is received by the TMC tuner and used by the navigation computer to recalculate the route being used to avoid the traffic disruption. This system information is broadcast on the RDS (radio data system) data carriers.